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## **MediBoost: a Patient Stratification Tool for Interpretable Decision Making in the Era of Precision Medicine**

Machine learning algorithms that are both interpretable and accurate are essential in applications such as medicine where errors can have a dire consequence. Unfortunately, there is currently a tradeoff between accuracy and interpretability among state-of-the-art methods. Decision trees are interpretable and are therefore used extensively throughout medicine for stratifying patients. Current decision tree algorithms, however, are consistently outperformed in accuracy by other, less-interpretable machine learning models, such as ensemble methods. We present MediBoost, a novel framework for constructing decision trees that retain interpretability while having accuracy similar to ensemble methods, and compare MediBoost's performance to that of conventional decision trees and ensemble methods on 13 medical classification problems. MediBoost significantly outperformed current decision tree algorithms in 11 out of 13 problems, giving accuracy comparable to ensemble methods. The resulting trees are of the same type as decision trees used throughout clinical practice but have the advantage of improved accuracy. Our algorithm thus gives the best of both worlds: it grows a single, highly interpretable tree that has the high accuracy of ensemble methods.

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